Fiber Entrance Cabinet (FEC)

User Manual

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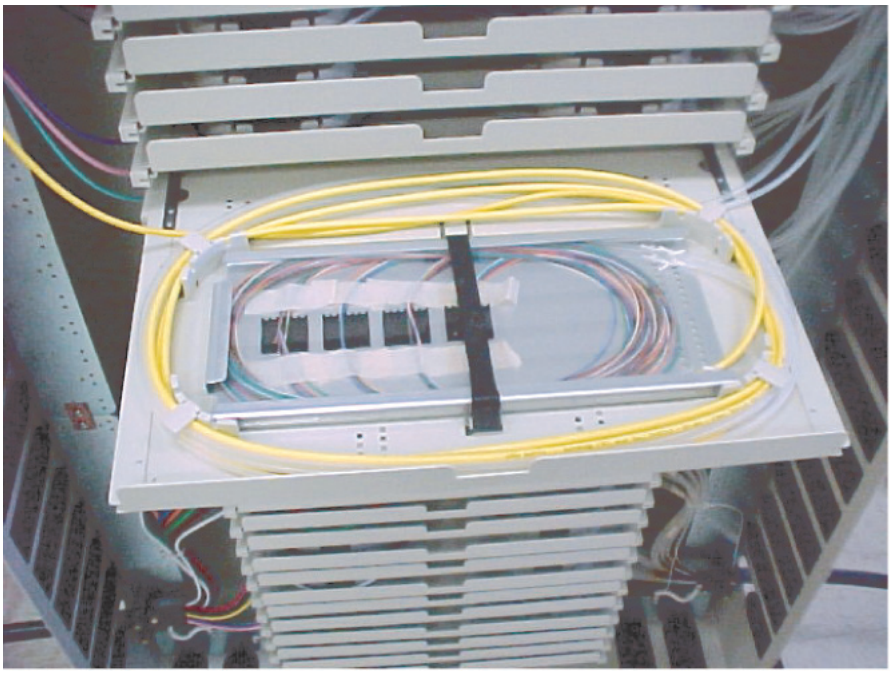

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INTRODUCTION

This user manual describes the ADC Fiber Entrance Cabinet (FEC) and explains how to install and operate this product. The different cable types available for use in the FEC require a variety of accessory kits. Each kit contains its own installation instructions.

Revision History

ISSUE	DATE	REASON FOR CHANGE
Issue 1	01/1993	Original.
Issue 2	02/1994	Incorporated mass splicing and new splice chip holders.
Issue 3	03/1994	Incorporated integrated splice drawers and reactivate conventional splice trays.
Issue 4	05/1994	Reactivated double tray conventional splice drawer.
Issue 5	12/1995	Changed cabinet dimensions. Remove use of standard tray in double tray drawer. Remove mini tray use in single tray drawer.
Issue 6	03/1997	Added the FEC-144 cabinet and standardizing on one conventional splice drawer.
Issue 7	11/1997	Updated corporate address.
Issue 8	01/1998	Reactivated integrated splice drawers.
Issue 9	06/1999	Updated to new format.
Issue 10	06/2001	Non-technical update.
Issue 11	12/2008	Note and text added saying Unibracket must be separately ordered.

Trademark Information

ADC is a registered trademark of ADC Telecommunications, Inc.

Related Publications

Listed below are related manuals and their publication numbers. Copies of these publications can be ordered by contacting the ADC Technical Assistance Center at 1-800-366-3891 (in U.S.A. or Canada) or 952-946-3000, extension 63475 (outside U.S.A. and Canada).

Title	ADCP Number
Fiber Cable Breakout and Moisture Blocking Kit for Armored Uni-Tube Cable Installation Instructions	93-039
Fiber Cable Breakout and Moisture Blocking Kit for Dielectric Uni-Tube Cable Installation Instructions	93-064
Ground Clamp and Moisture Blocking Kit for Loose Tube Cable Installation Instructions	93-045
Three Tier Cable Clamp Kit (OSP-CLPFEC) Installation Instructions	93-035
Three Tier Cable Clamp Kit (OSP-CLPFEC-LG) Installation Instructions	93-080

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Admonishments

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times. These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.

⚠ **Danger:** *Danger is used to indicate the presence of a hazard that **will** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

⚠ **Warning:** *Warning is used to indicate the presence of a hazard that **can** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

⚠ **Caution:** *Caution is used to indicate the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.*

1 DESCRIPTION

The Fiber Entrance Cabinet (FEC) is a wall- or strut-mounted splicing cabinet available in the four sizes shown in Figure 1 and Figure 2. The four sizes accommodate from 144 to 864 fiber cable splices. The FEC is designed for applications requiring an interface for Intrafacility Fiber cable (IFC) and Outside Plant (OSP) cable. It provides storage and protection in addition to splicing.

All four sizes of cabinets are available with either conventional style or integrated style splice drawers. The conventional splice drawer has radius limiters and one or two standard size splice trays. The integrated splice drawer has splice chip holders that accommodate up to 48 mass mechanical or 144 mass fusion (ribbon) splices as well as 24 stranded splices. Both styles of splice drawers accommodate service loop storage which allows splicing away from the FEC.

Cable access ports are located at the top, bottom, and both sides of the cabinet. Pre-formed rubber grommets are provided in each cable access port. The grommets have micro slits that can be easily cut out to match cable diameter. Each grommet can handle up to three cables. Terminating and grounding plates provide cable clamp and ground connection points for IFC/OSP cables. The door hinges are split and allow the door to be removed for full access to the cabinet. The door is secured with over-center draw latches that are designed to accommodate padlocks for additional security.

Figure 3 shows the interior components of the FEC-288. As shown, the FEC-144, FEC-576 and FEC-864 are basically same as the FEC-288 internally, except for the number of cable access ports and splice drawers. There are eight top and bottom access ports for all cabinets while there are 6, 12, 24, and 36 side access ports for the FEC-144, FEC-288, FEC-576, and FEC-864 respectively.

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Typical accessories for the FEC are:

- Ground Clamp, Fiber Breakout and Moisture Blocking Kits (for Uni-Tube cable)
- Ground Clamp and Moisture Blocking Kits (for Loose-Tube cable)
- Three Tier Clamp Kit
- Splice Holders

For more information on accessories, refer to ADC Catalog 804 (Fiber Cable Management Products) or to the ADC web site at www.adc.com.

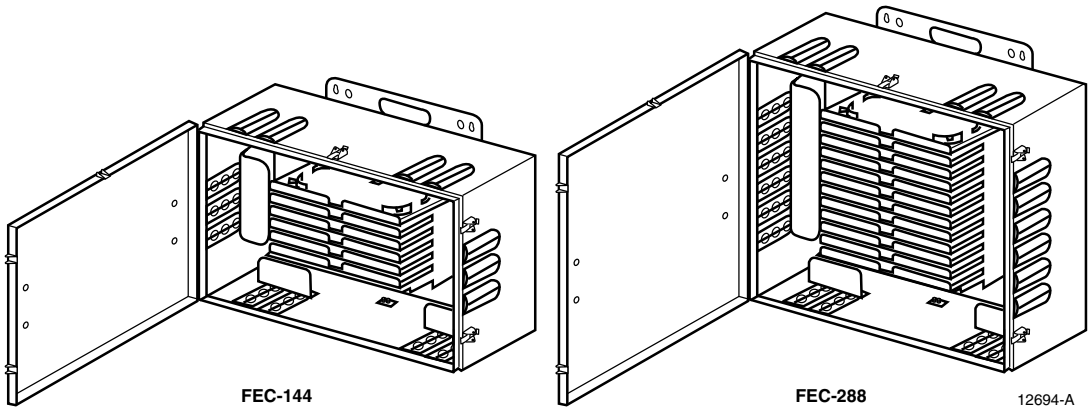

Figure 1. FEC-144 and FEC-288

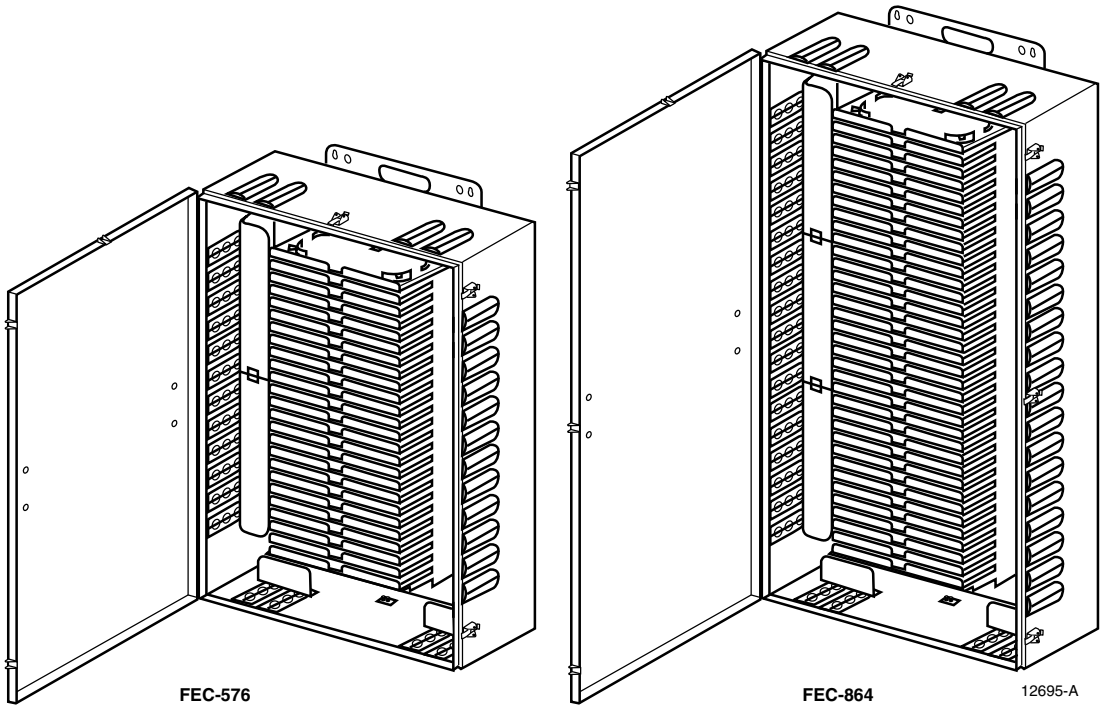

Figure 2. Fiber Entrance Cabinets

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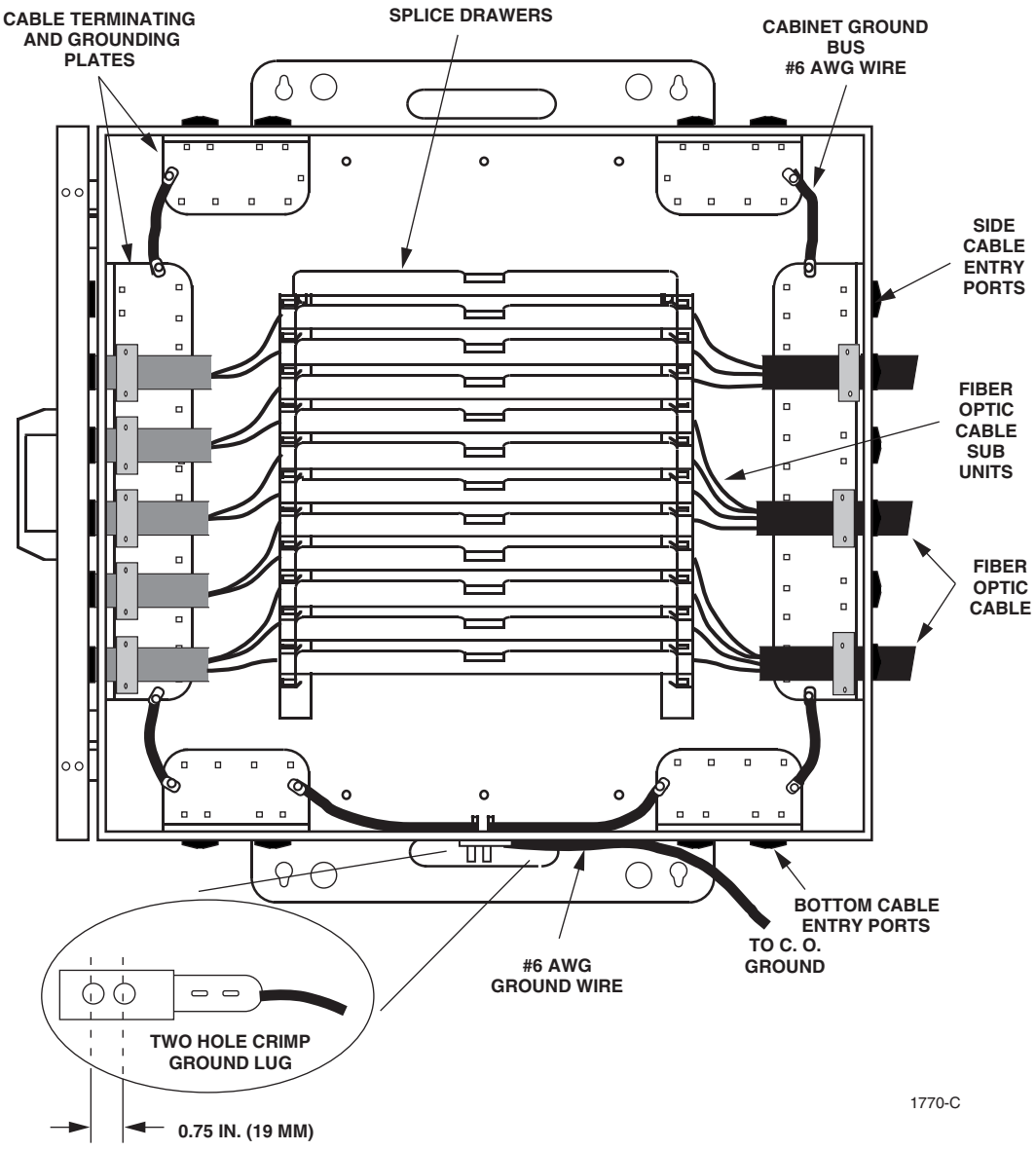

Figure 3. FEC-288 Interior Components

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2 SPECIFICATIONS

Table 1. Fiber Entrance Cabinet Specifications

PARAMETER	FEC-144	FEC-288	FEC-576	FEC-864
Height	19.5 inches (49.5 cm)	28 inches (71.1 cm)	45 inches (114.3 cm)	62 inches (157.5 cm)
Width	32 inches (81.3 cm)	32 inches (81.3 cm)	32 inches (81.3 cm)	32 inches (81.3 cm)
Depth	13.5 inches (34.3 cm)	13.5 inches (34.3 cm)	13.5 inches (34.3 cm)	13.5 inches (34.3 cm)
Weight (approximate)	50 pounds (22.7 kg)	80 pounds (36.3 kg)	120 pounds (54.4 kg)	160 pounds (72.6 kg)
Number of side ports	6	12	24	36
Number of top and bottom ports	8	8	8	8
Splice drawers	6	12	24	36
Splice capacity	144 to 864*	288 to 1728*	576 to 3456*	864 to 5184*
Cable size O.D.	0.30 – 1.2 inches (7.6 mm – 30.5 mm)	0.30 – 1.2 inches (7.6 mm – 30.5 mm)	0.30 – 1.2 inches (7.6 mm – 30.5 mm)	0.30 – 1.2 inches (7.6 mm – 30.5 mm)
Cable bend radius	10 times the diameter of the cable	10 times the diameter of the cable	10 times the diameter of the cable	10 times the diameter of the cable
Fiber bend radius (minimum)	1.5 inches (3.81 cm)	1.5 inches (3.81 cm)	1.5 inches (3.81 cm)	1.5 inches (3.81 cm)

* Depends upon splicing method

3 UNPACKING AND INSPECTION

1. Inspect the exterior of the shipping container(s) for evidence of rough handling that may have damaged the components in the container.
2. Unpack each container while carefully checking the contents for damage.
3. If damage is detected or if parts are missing, file a claim with the commercial carrier and then notify ADC Customer Service. Save damaged cartons for inspection by the carrier.
4. Refer to the Section 7 on Page 22 for information on how to contact ADC.

4 FEC MOUNTING

The FEC may be wall mounted or mounted to Unistrut. The mounting materials such as backboard, anchors, bolts, and Unistrut materials are not provided. Contact local support staff for their practices and recommendations for providing and using mounting materials. In the following instructions, the reference to mounting materials, such as 0.75-inch (19 mm) thick plywood, are recommendations only.

Note: An ADC Uni-bracket is required in the following procedure and must be separately ordered (catalog #FEC-UNIBKT: ACC BKT FEC UNISTRUT BLK).

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4.1 Unistrut Mount

The vertical wall racks and Unistrut materials used in the following procedure are not provided and not available from ADC. The Uni-bracket used in the procedure is available from ADC but must be ordered separately (see **Note** above for catalog number). It is recommended to use 0.50-inch (12.7 mm) and 0.25-inch (6.35 mm) size bolts and spring nuts. Use Figure 4 and the following instructions to mount the cabinet:

1. Determine the location for the cabinet and insert the Uni-brackets in the wall rack.

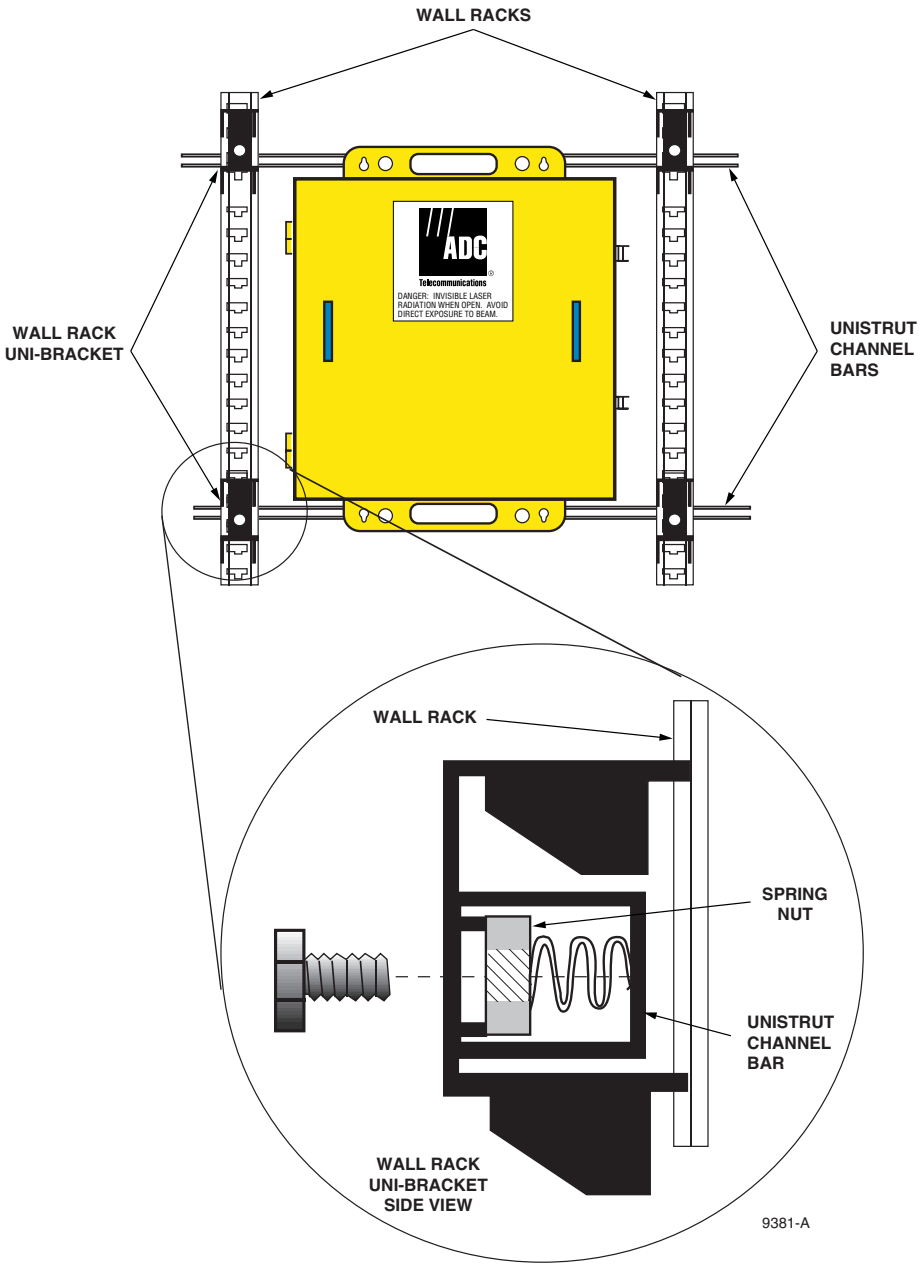

Figure 4. Unistrut Mounted FEC-288

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2. Position two 0.50-inch (12.7 mm) Unistrut spring nuts in each Unistrut channel bar. Locate the spring nuts at the approximate position of the Uni-bracket hole and the FEC mounting holes.
3. Insert the Unistrut channel bars through the Uni-brackets.
4. Thread a 0.50-inch (12.7 mm) mounting bolt through each Uni-bracket into the Unistrut spring nuts. Align the Unistrut channel bars and tighten the bolts.
5. Place two 0.25-inch (6.35 mm) Unistrut spring nuts into the top Unistrut channel bar. Thread two 0.25-inch (6.35 mm) mounting bolts into the Unistrut spring nuts.
6. Place the FEC top mounting holes (keyholes) over the bolts. Position the FEC and tighten the bolts.
7. Place two 0.25-inch (6.35 mm) Unistrut spring nuts into the bottom Unistrut channel bar. Thread two 0.25-inch (6.35 mm) mounting bolts through the FEC bottom mounting holes into the Unistrut spring nuts and tighten.
8. Prepare a ground lead from central office ground to the FEC. Use #6 AWG wire and attach to a two hole crimp type lug (wire and lug not provided). Connect to the ground posts at the bottom of the FEC. Refer to Figure 3.
9. Attach cable designation labels on each splice drawer for IFC and OSP cable assignments.

4.2 Wall Mount

The FEC may be mounted on a stable flat vertical surface. A backboard material (not provided) such as 0.75-inch (1.9 cm) thick plywood, applied to a wall provides a suitable mounting surface. The choice of fasteners is governed by local practice. It is recommended to use, as a minimum, 0.375-inch (9.5 mm) diameter lag bolts and/or anchors. If mounting on a hollow frame, wall backboard on both sides and through bolts are recommended. If the FEC is mounted directly to a concrete wall with anchors, ensure that the wall is straight so that when the fasteners are tightened the cabinet shape is not distorted. Shims may be required. The door must fit square to provide a water resistant seal. The position of the FEC must allow enough space on all sides to bring the fiber cables in with out exceeding the minimum bend radius for the cable. See Figure 5. The standard rule for cable bend radius is, the bend radius should be equal to or greater than ten times the cable diameter. Always allow enough space between FECs based on the largest cable that will be installed.

When determining the wall mounting locations, consider the following recommendations:

- Place cable racks a minimum of 10 inches (25.4 cm) from each side of the FEC.
- Use 5-inch (12.7 cm) cable rack for FEC-144 and FEC-288 cabinets and 10-inch (25.4 cm) cable rack for FEC-576 and FEC-864 cabinets.
- Allow at least 24 inches (61 cm) from the floor to the bottom of the FEC-288, FEC-576 and FEC-864 cabinets. Allow 36 inches (91.4 cm) for the FEC-144 cabinet.
- FEC-144 and FEC-288 cabinets may be stacked. If stacking FEC-288 cabinets, use 10-inch (25.4 cm) cable rack.
- Do not stack FEC-576 and FEC-864 cabinets.

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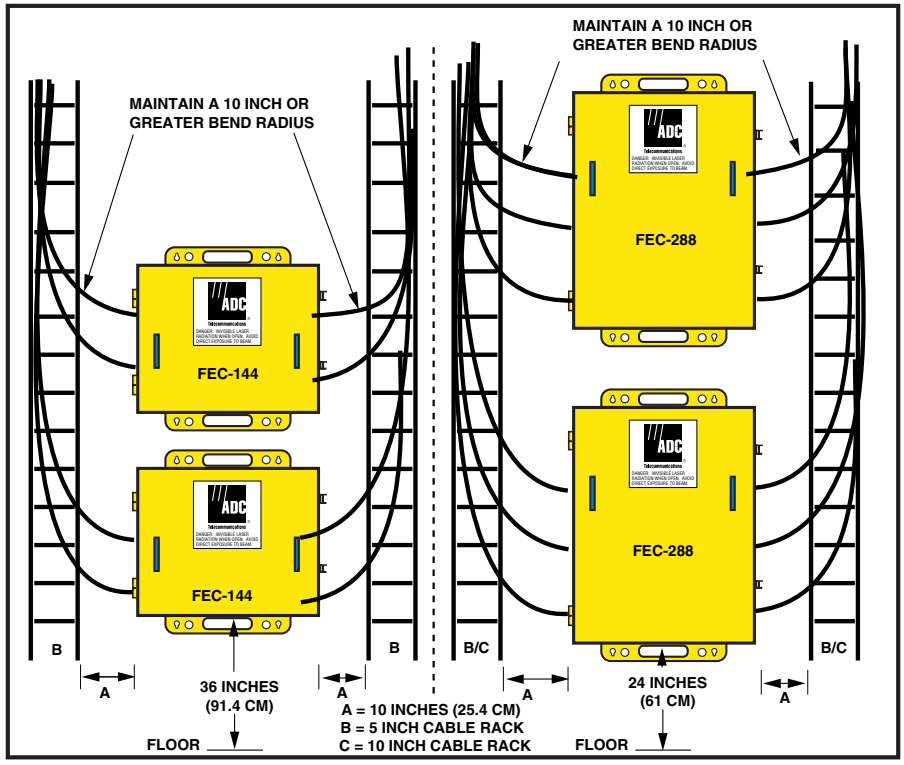

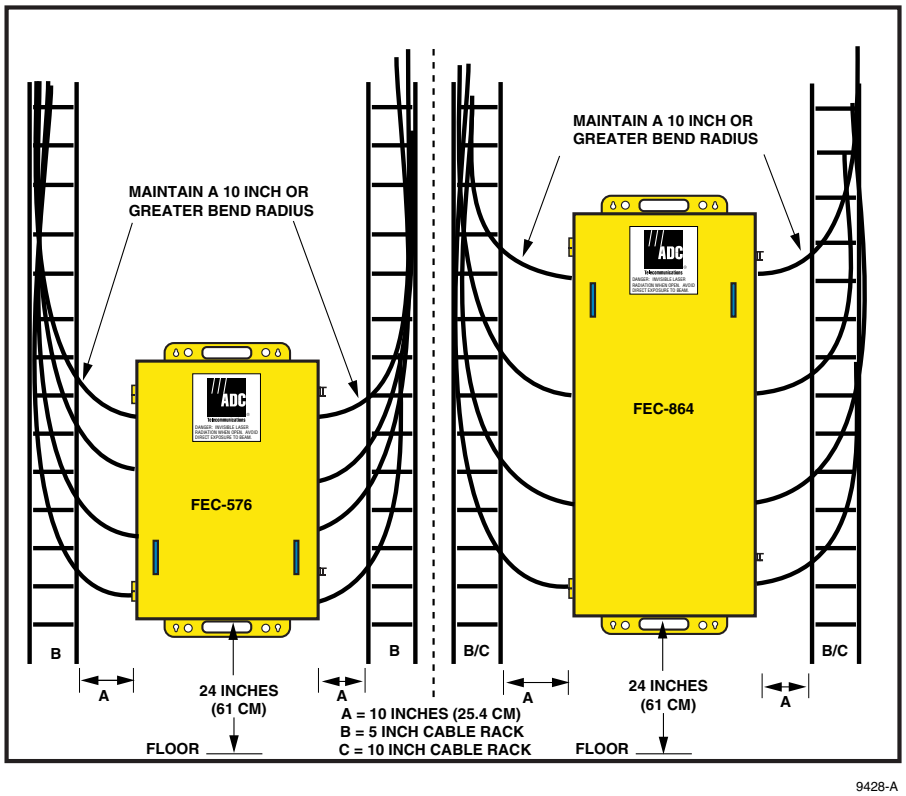

Figure 5. Recommended Positioning for Different Models

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Use the following procedure to wall-mount each FEC:

1. Determine the FEC mounting location. Mark hole positions using dimensions shown in Figure 6.
2. Drill four holes for anchor bolts (or moly bolts) in the backboard or four holes in a concrete wall for anchors at the points marked in Step 1. If using anchors place the anchors in the holes.
3. Partially install two mounting bolts (not provided) in the top holes.
4. Place the FEC top mounting holes (keyholes) over the bolts.
5. Insert two bolts into the bottom mounting holes. Tighten all bolts.
6. Prepare a ground lead from central office ground to the FEC. Use #6 AWG wire and attach to a two hole crimp type lug (wire and lug not provided). Connect to the ground posts at the bottom of the FEC. Refer to Figure 3.
7. Attach cable designation labels on each splice drawer for IFC and OSP cable assignments.

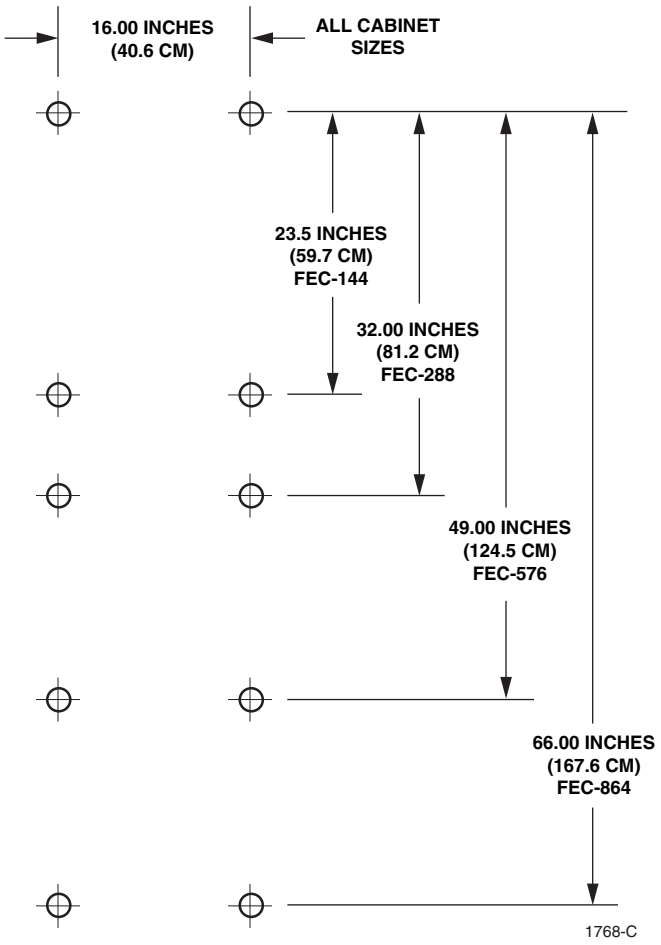

Figure 6. FEC Mounting Hole Locations

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5 CABLE INSTALLATION

When installing cables in the FEC, perform the following activities in the order listed:

Danger: *Do not look into the ends of any optic fiber. Exposure to invisible radiation may result. Do not assume laser power is turned off or the fiber is disconnected at the other end.*

1. Plan where each cable and its component fibers will be routed, based on the following guidelines.
   a. If both single and multi-mode cables are used, or composite cables, assign the single and multi-mode fibers to separate splice drawers.
   b. Assign the cable subgroups to splice drawers in line with or above the cable access port. For examples, refer to Figure 7 for cables having less than 144 fibers, refer to Figure 8 for cables having 144 or more fibers.
2. Determine the breakout dimensions for each cable and fiber based on the distance from the cable entry port to the assigned splice drawer. Figure 9 shows recommended breakout dimensions. Points B, C, and D, within the splice tray, will be shown in more detail when the subunits are routed into the splice module.

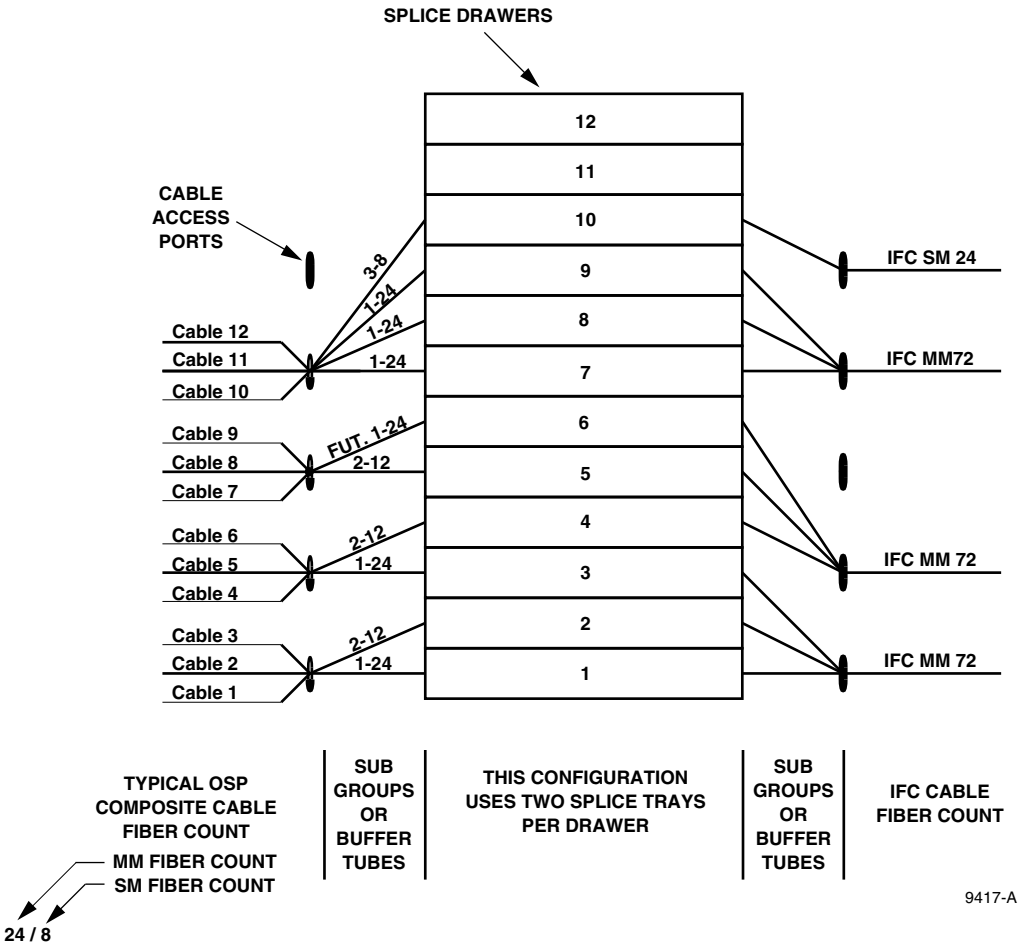

Figure 7. Example of Buffer Tube Distribution (Cable With Less Than 144 Fibers)

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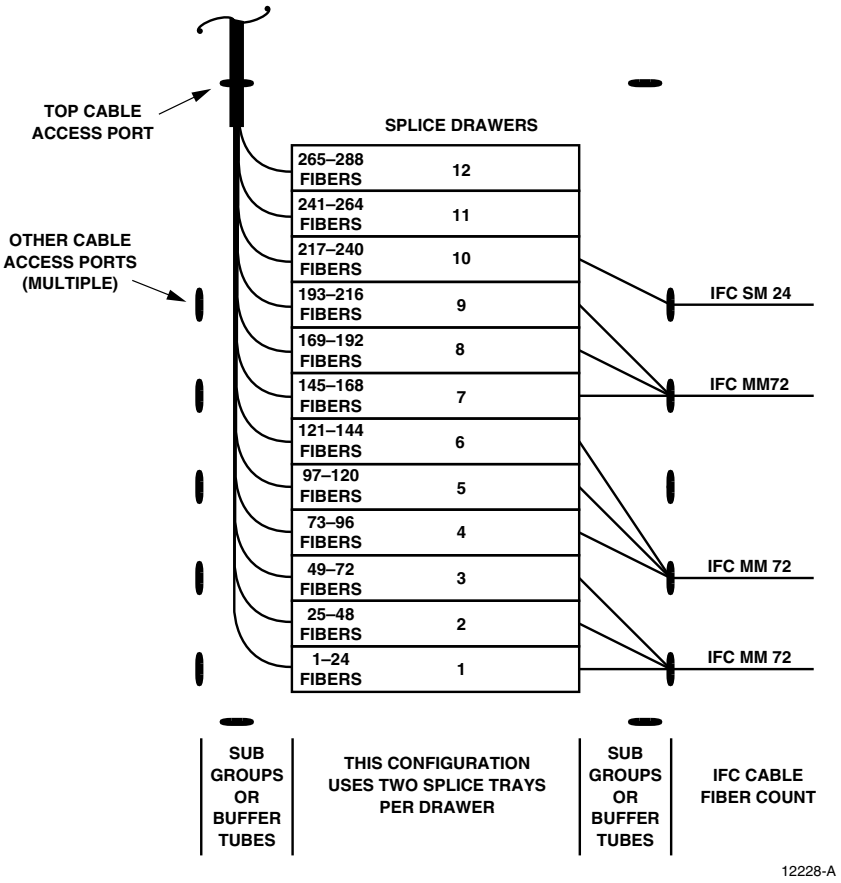

Figure 8. Example of Buffer Tube Distribution (Cable With More Than 144 Fibers)

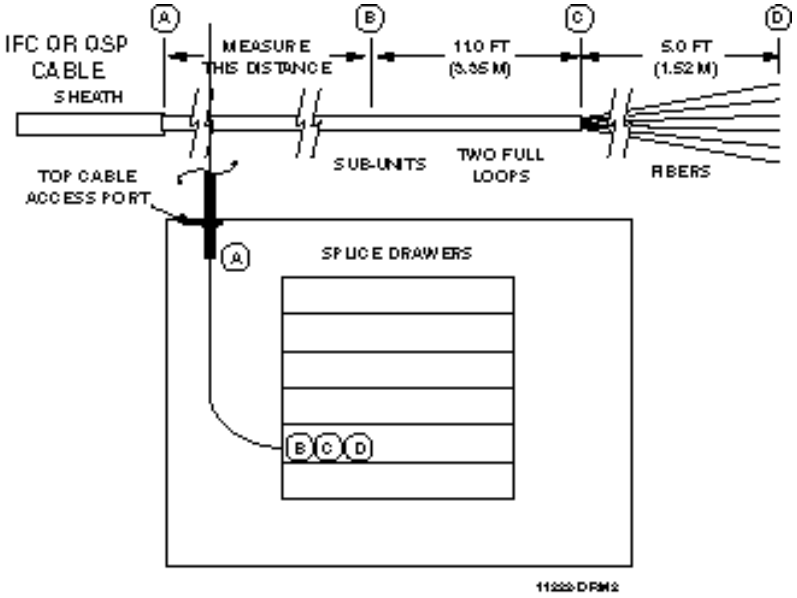

Figure 9. Cable Breakout Dimensions

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3. Break out the cable corresponding to the dimensions arrived at in the previous step. Follow the cable manufacturer's recommendations for stripping the cable jacket and cleaning of buffer tubes/ribbons.
4. Install the appropriate fiber cable breakout and moisture blocking kit following the instructions provided in the kit. Unitube cables require a flare tube kit such as shown in Figure 10. Loose tubes require a kit such as shown in Figure 11. For kit selection, refer to ADC catalog 804 (Fiber Cable Management Products). Also, see the relevant ADC document identified in "Related Publications" in the front matter of this manual.

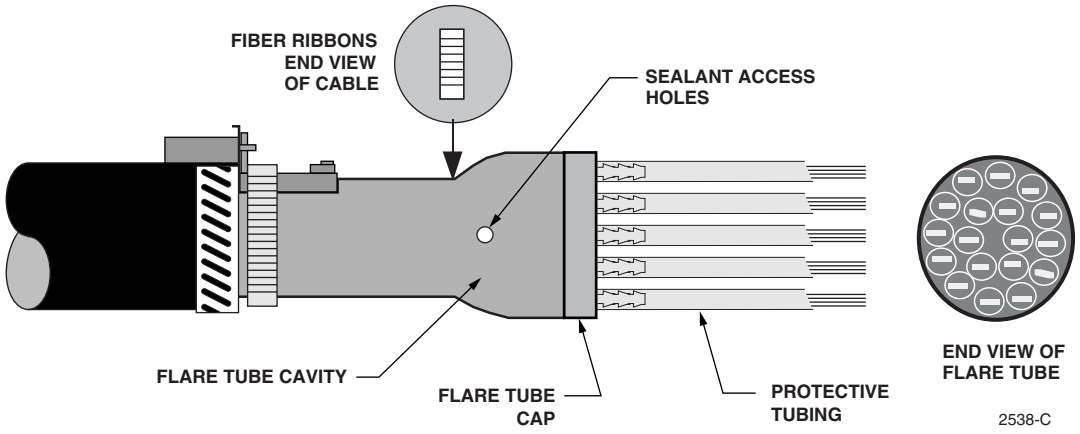

Figure 10. Unitube Kit Example

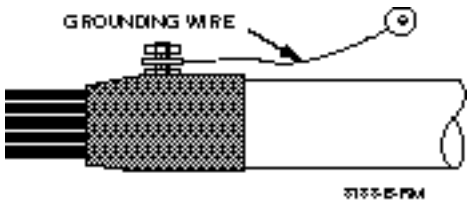

Figure 11. Loose Tube Kit Example

5. Remove the cable entry grommets from the selected cable entry ports. Set the grommets aside for later reuse. Carefully feed through the cable subunits.
6. Select the cable clamp to be used. Single, dual, and triple cable clamps are available. Install the cable following the instructions provided in the kit.
7. Route fibers from the cable entry point to the assigned splice trays and secure them in subgroups of six as shown in Figure 12.
8. Route fibers from the left side to the left rear corner of the splice drawer. Route fibers from the right side to the right rear corner of the splice drawer. Refer to Figure 13, Figure 14, and Figure 15. (Points B, C, and D in Figure 15 refer to cable breakout dimensions shown in Figure 9.) If necessary, adjust fibers as shown in Figure 16. Figure 17 shows routing for an integrated splice drawer (mass ribbon splice).

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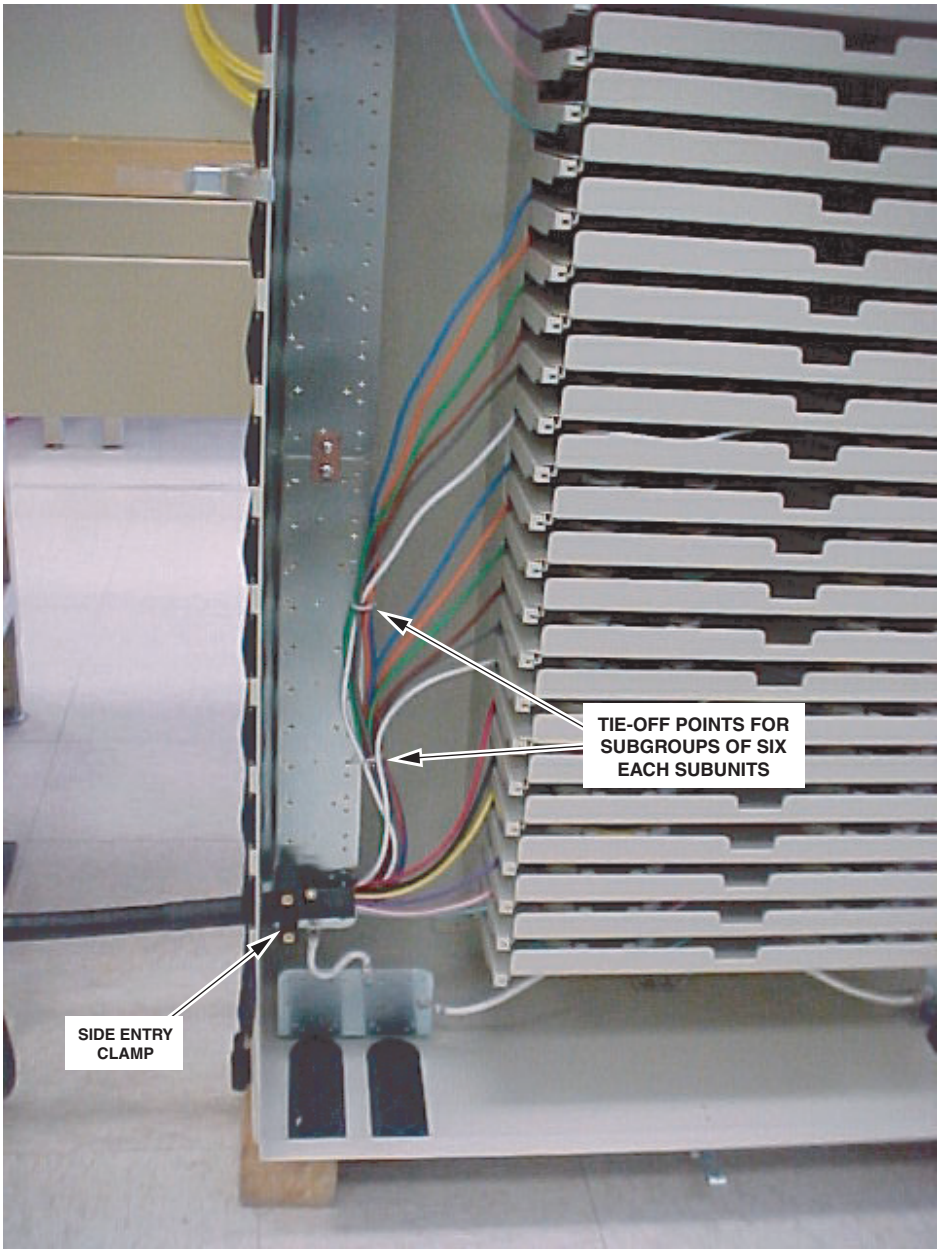

Figure 12. Routing Subunits from Cable Clamp

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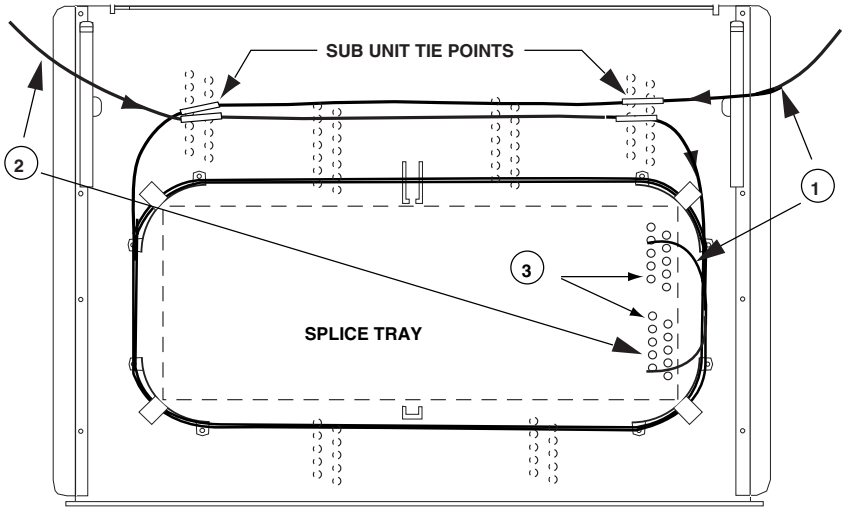

① SUB UNITS ENTERING THE DRAWER FROM THE RIGHT SIDE, ROUTE COUNTER-CLOCKWISE AROUND THE RADIUS LIMITERS AND ENTER THE SPLICE TRAY AT THE RIGHT SIDE TOP. (IF THE SPLICE TRAY IS REVERSED THE SUB UNITS ENTER AT LEFT SIDE BOTTOM).

② SUB UNITS ENTERING THE DRAWER FROM THE LEFT SIDE, ROUTE CLOCKWISE AROUND THE RADIUS LIMITERS AND ENTER THE SPLICE TRAY AT THE RIGHT SIDE BOTTOM. (IF THE SPLICE TRAY IS REVERSED THE SUB UNITS ENTER AT LEFT SIDE TOP).

③ SUB UNIT PROTECTIVE TUBING ENDS AT THE SPLICE TRAY TIE POINTS. 4566-E

Figure 13. Routing Sub-Units in Conventional Splice Drawer

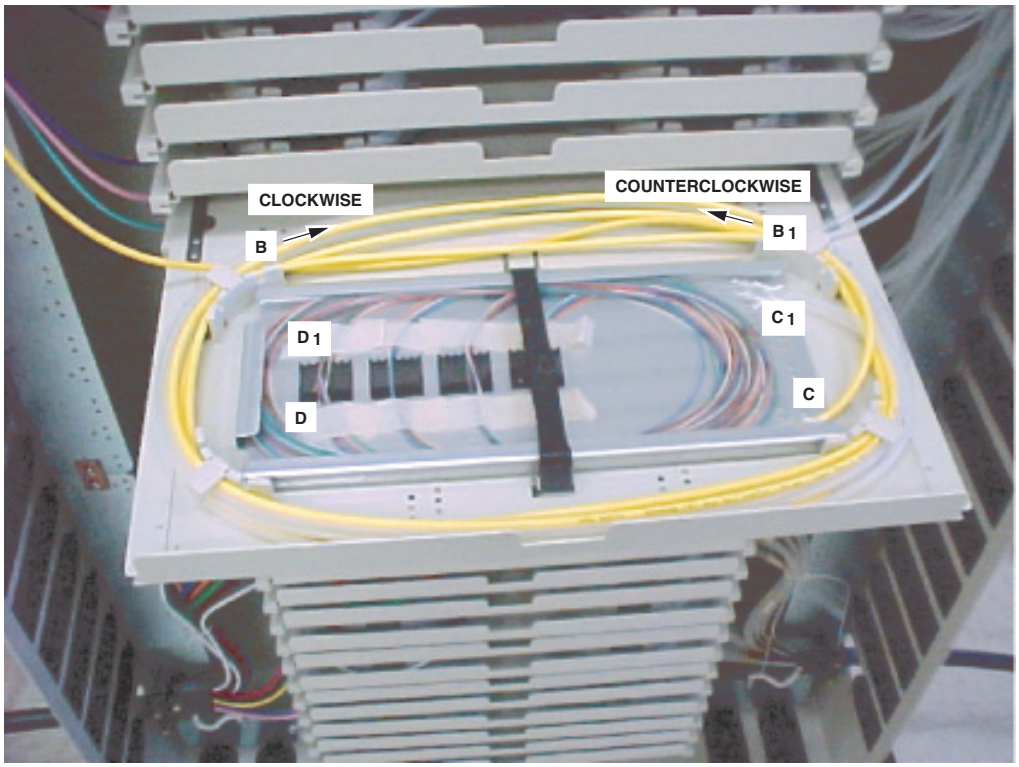

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Figure 14. Routing Sub-Units in Conventional Splice Drawer

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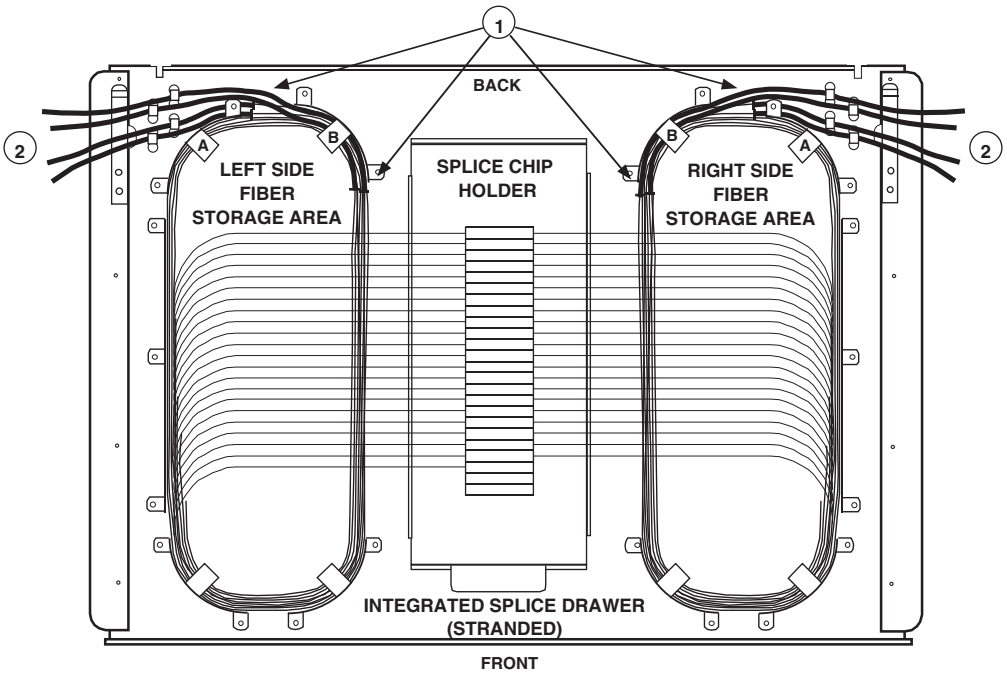

NOTE: ROUTE AND STORE THE FIBERS CLOCKWISE IN THE LEFT STORAGE AREA. ROUTE AND STORE THE FIBERS COUNTER-CLOCKWISE IN THE RIGHT STORAGE AREA.

1. PROTECTIVE TUBING ENDS AT THE END OF THE RESPECTIVE RADIUS LIMITERS (A OR B).
2. USE RADIUS LIMITER (A) FOR FIRST TWO SUBUNITS AND RADIUS LIMITER (B) FOR FOLLOWING TWO SUBUNITS.
3. ROUTE AND STORE THE FIBERS WITH THE SPLICE END OVER THE TOP OF THE STORED LOOPS.

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Figure 15. Routing Sub-Units in Integrated Splice Drawer (Stranded)

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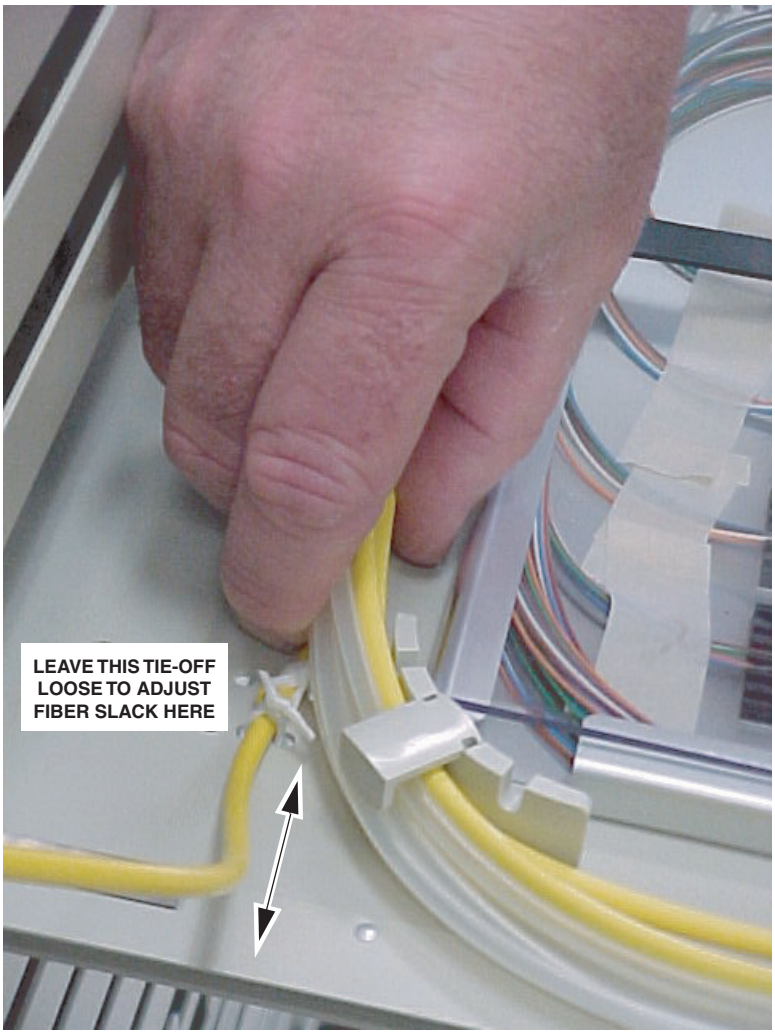

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Figure 16. Adjusting Fibers in Splice Drawer

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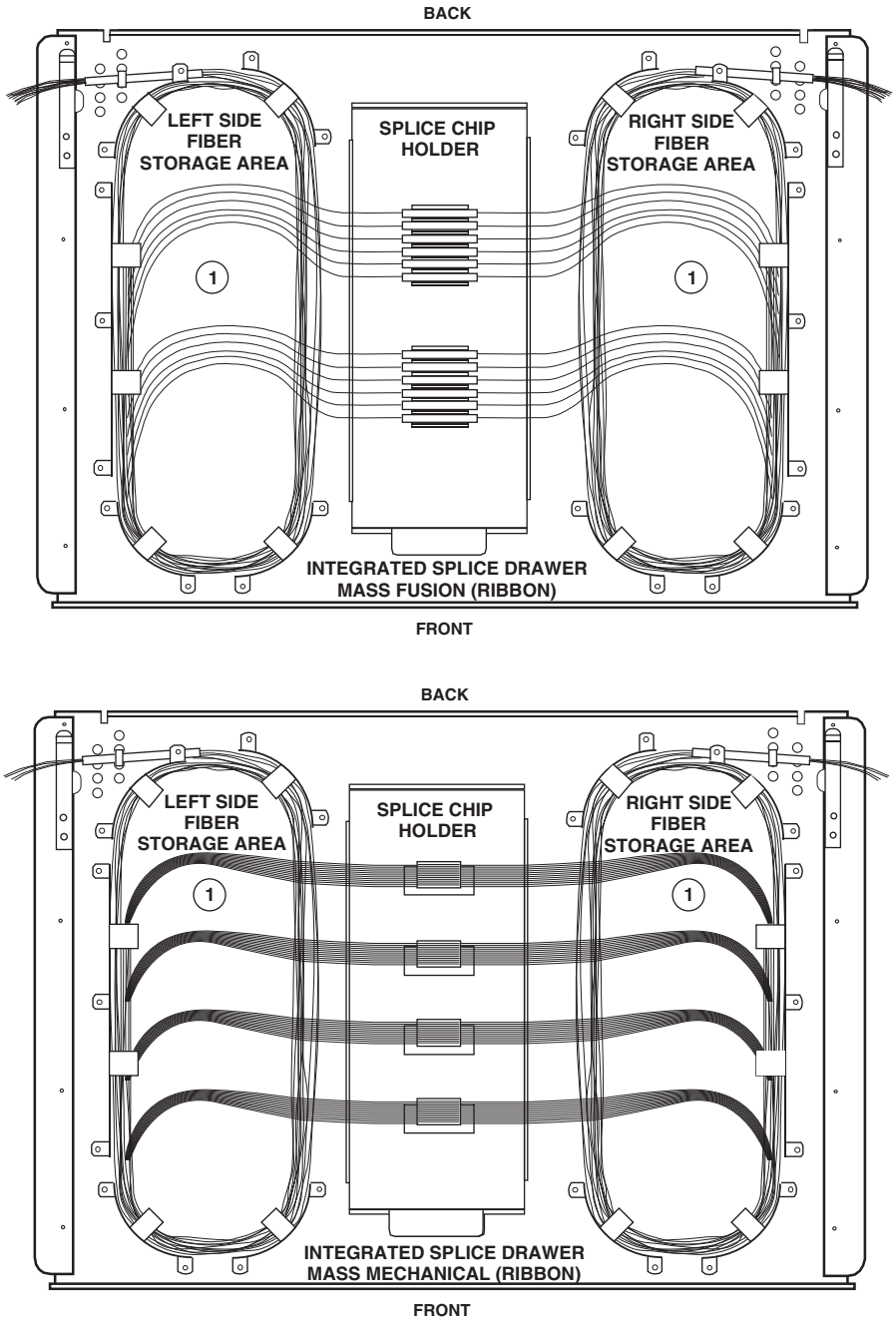

NOTE: ROUTE AND STORE THE FIBERS CLOCKWISE IN THE LEFT STORAGE AREA. ROUTE AND STORE THE FIBERS COUNTER-CLOCKWISE IN THE RIGHT STORAGE AREA.

(1) ROUTE AND STORE THE FIBERS WITH THE SPLICE END OVER THE TOP OF THE STORED LOOPS.

3596-C

Figure 17. Routing Sub-Units in Integrated Splice Drawer (Mass Ribbon Splice)

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9. Route and secure the protective tubes to the designated splice drawers and store the fibers in the splice drawer for splicing later. Adhere to the cautionary statements shown in Figure 18.

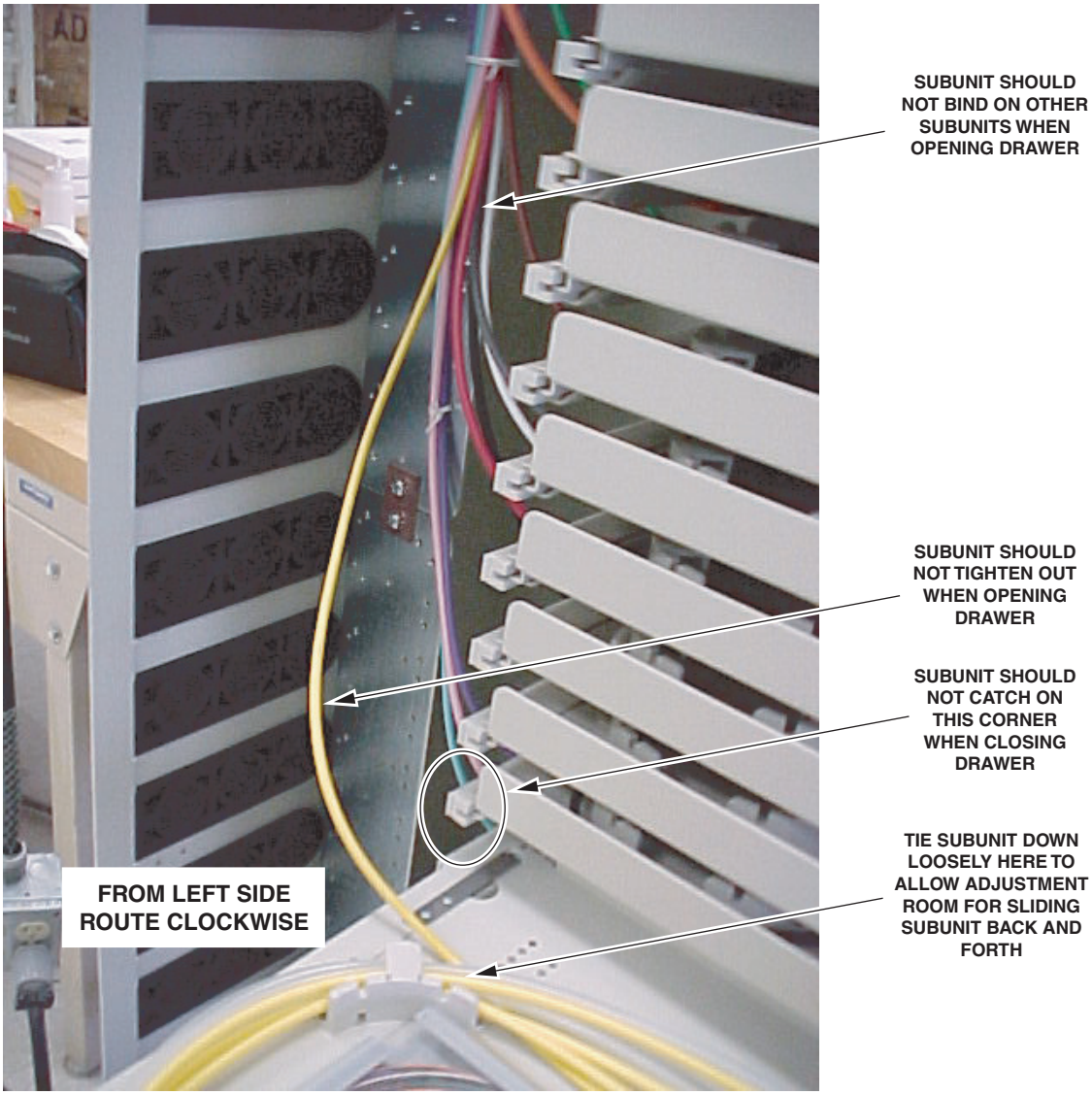
SUBUNIT SHOULD NOT BIND ON OTHER SUBUNITS WHEN OPENING DRAWER
SUBUNIT SHOULD NOT TIGHTEN OUT WHEN OPENING DRAWER
SUBUNIT SHOULD NOT CATCH ON THIS CORNER WHEN CLOSING DRAWER
TIE SUBUNIT DOWN LOOSELY HERE TO ALLOW ADJUSTMENT ROOM FOR SLIDING SUBUNIT BACK AND FORTH
FROM LEFT SIDE ROUTE CLOCKWISE
12557-A

Figure 18. Guidelines for Fiber Routing into Tray

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5.1 Splicing

Danger: *Do not look into the ends of any optic fiber. Exposure to invisible radiation may result. Do not assume laser power is turned off or the fiber is disconnected at the other end.*

Use the following procedures to complete the splicing of the OSP and IFC fibers.

1. If not already open, release the door latches and swing open or remove the door.
2. Remove the splice tray to a work area within reach of the service loop (Figure 19).

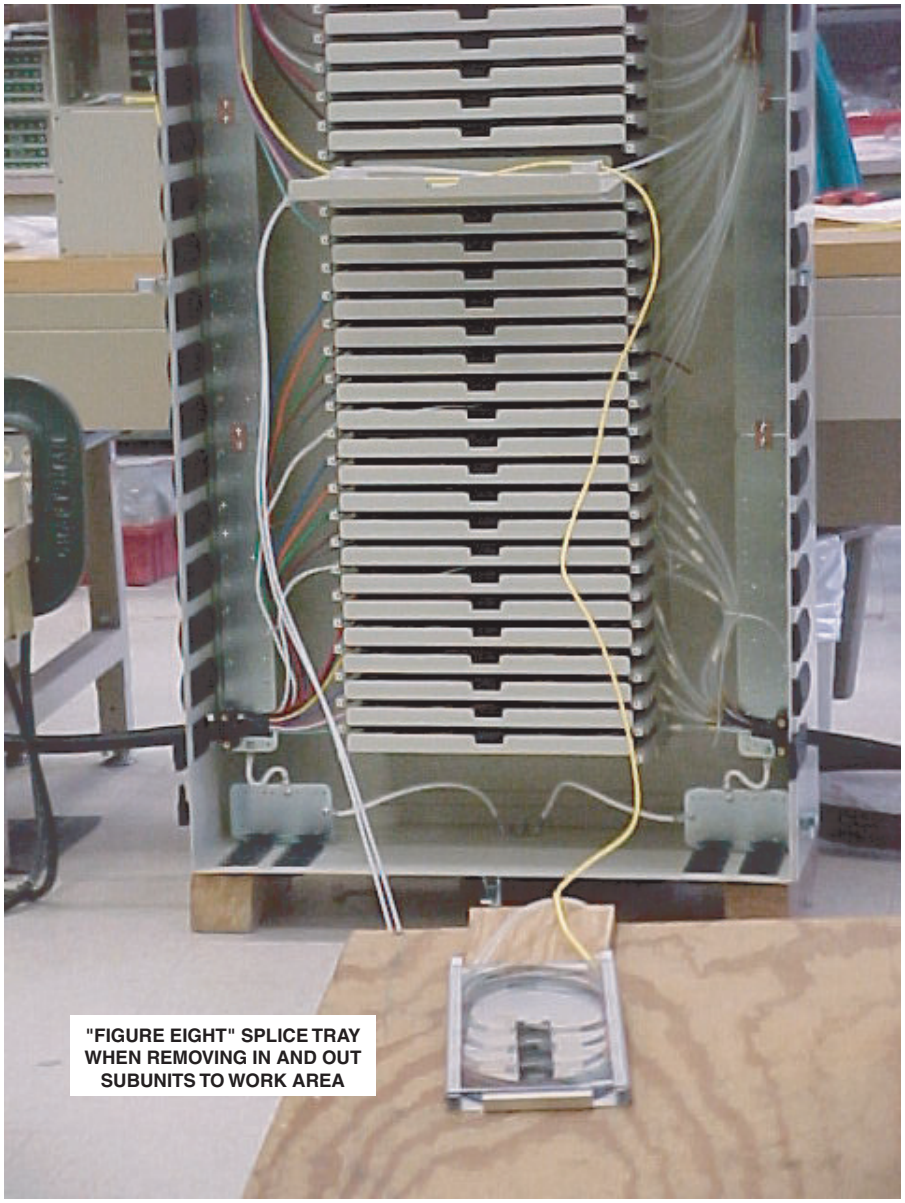

Figure 19. Removing the Splice Tray to a Work Area

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3. Remove the splice holder or tray cover. If not already installed on the tray, install an appropriate splice chip that matches the splicing method.
4. Strip the sub-unit outer jacket from the fibers using locally approved practice. Secure the sub-unit to the tray. Carefully route the individual fibers or ribbons in the tray. Refer to Figure 7, Figure 8 and Figure 12, Figure 13, Figure 14 and Figure 15.
5. Splice each individual fiber using local procedures and carefully secure each completed splice in the splice chip.
6. Dress and route the fibers in the splice holder or tray. Install the cover on the splice holder or tray to protect the splices.
7. Repeat Steps 2 through 7 for the other OSP and IFC splices.
8. Ensure all the OSP and IFC sub-units are neatly routed, stored and secured. Close the door and secure the latches.

6 OPERATION

Operation consists of opening and closing the door.

The doors are secured with over-center draw latches. To release the latch, pull out from the cabinet. To secure the latch, push the latch forward over-center to catch the tab on the cabinet, then draw back and press in on the latch to secure the door.

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7 CUSTOMER INFORMATION AND ASSISTANCE

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U.S.A. or CANADA

Sales: 1-800-366-3891
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Technical Assistance: 1-800-366-3891
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ELSEWHERE

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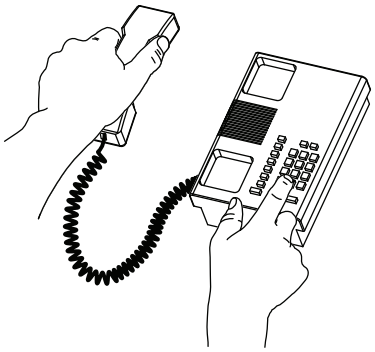

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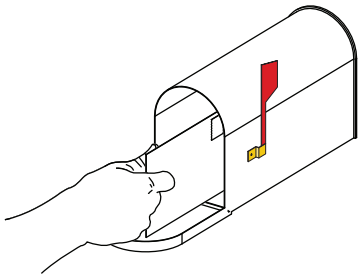

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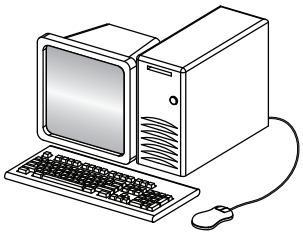

REPRINTS:

PDF copies of manuals are available for downloading at the following link:

www.adc.com/manuals **ADCP Number: 93-031**

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